W. S. GEMMER.

TRAMWAY TOWER SADDLE.

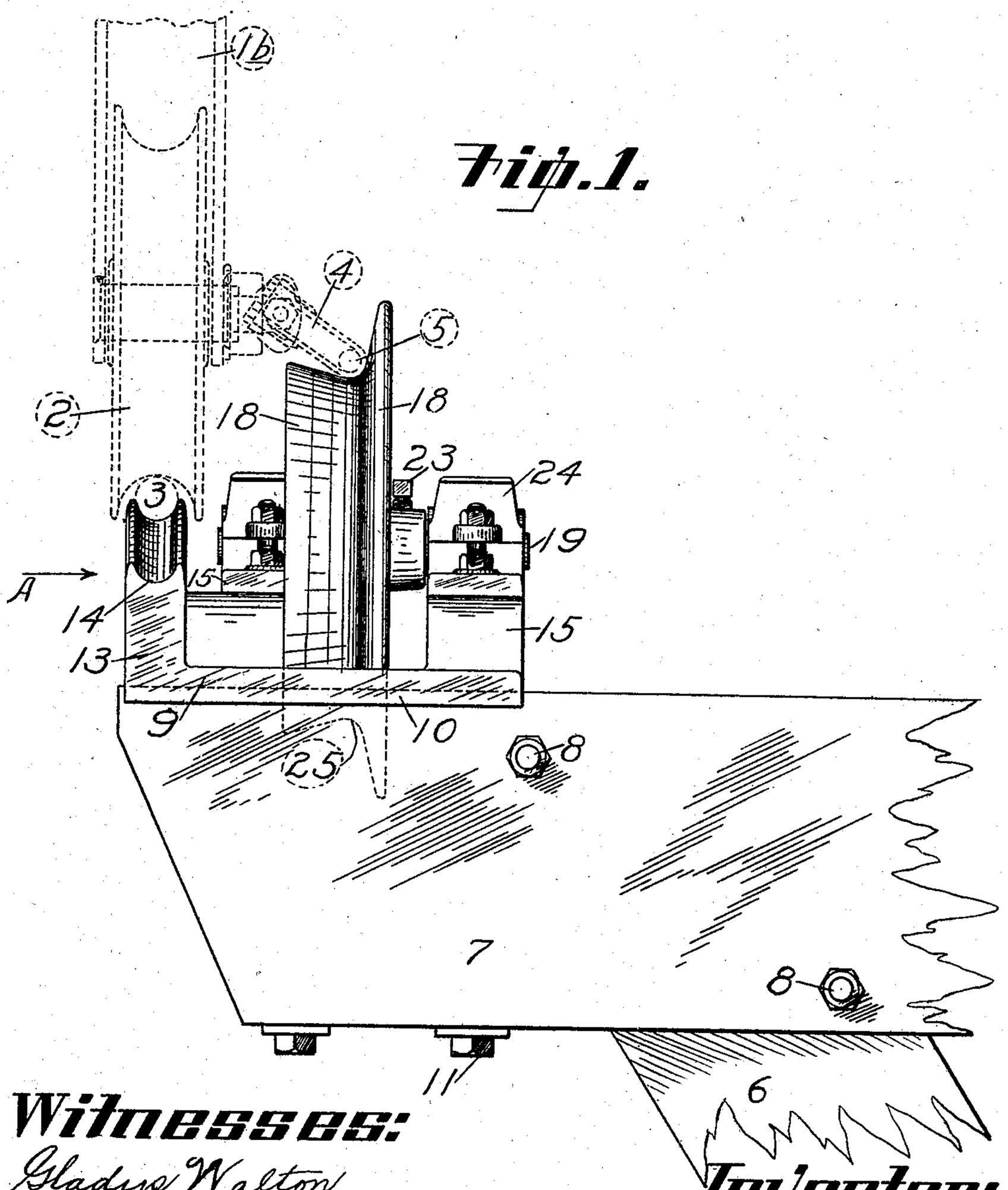
APPLICATION FILED JUNE 1, 1908.

900,923.

Patented Oct. 13, 1908.

8 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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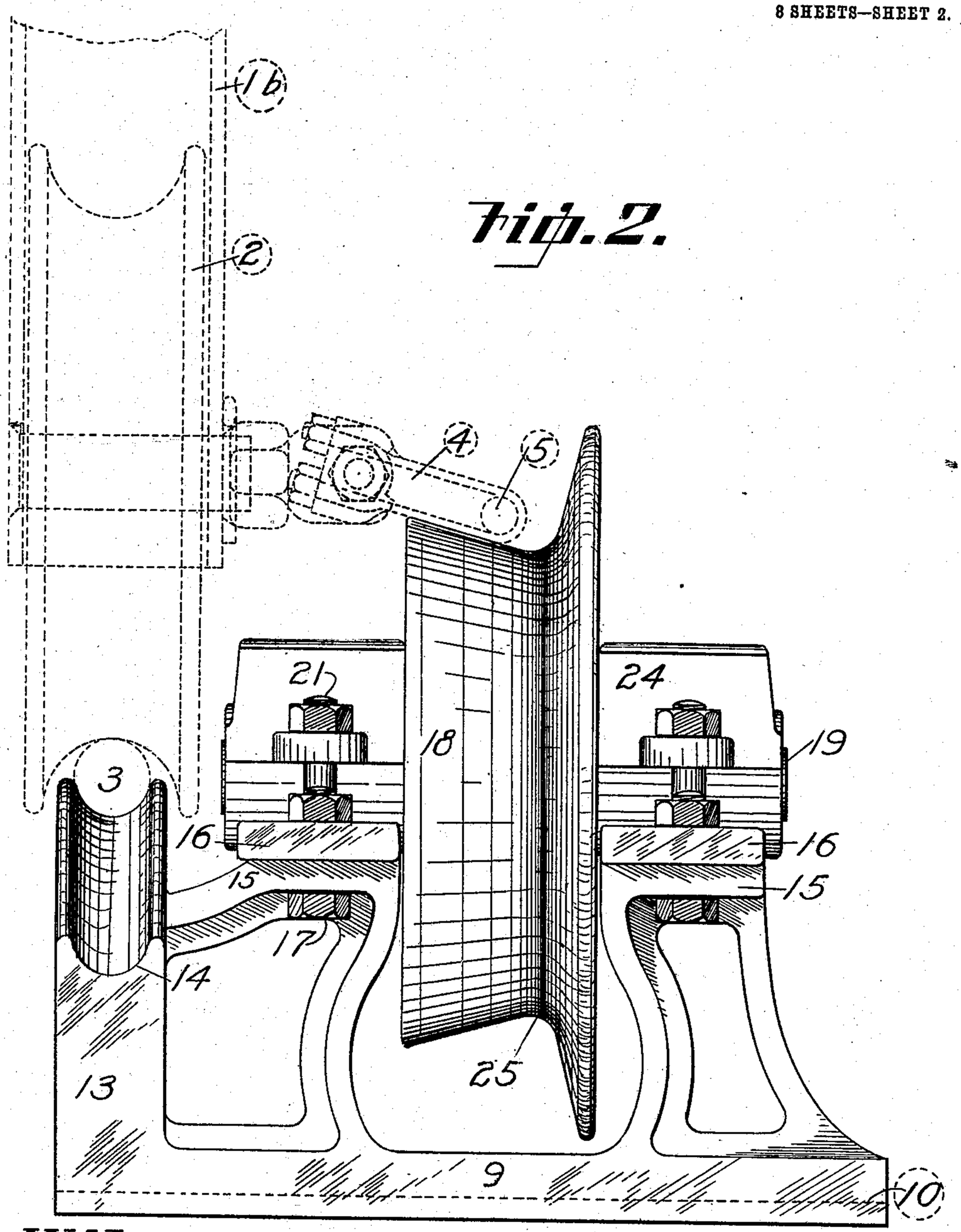
8 SHEETS—SHEET 2.

Fig. 2.



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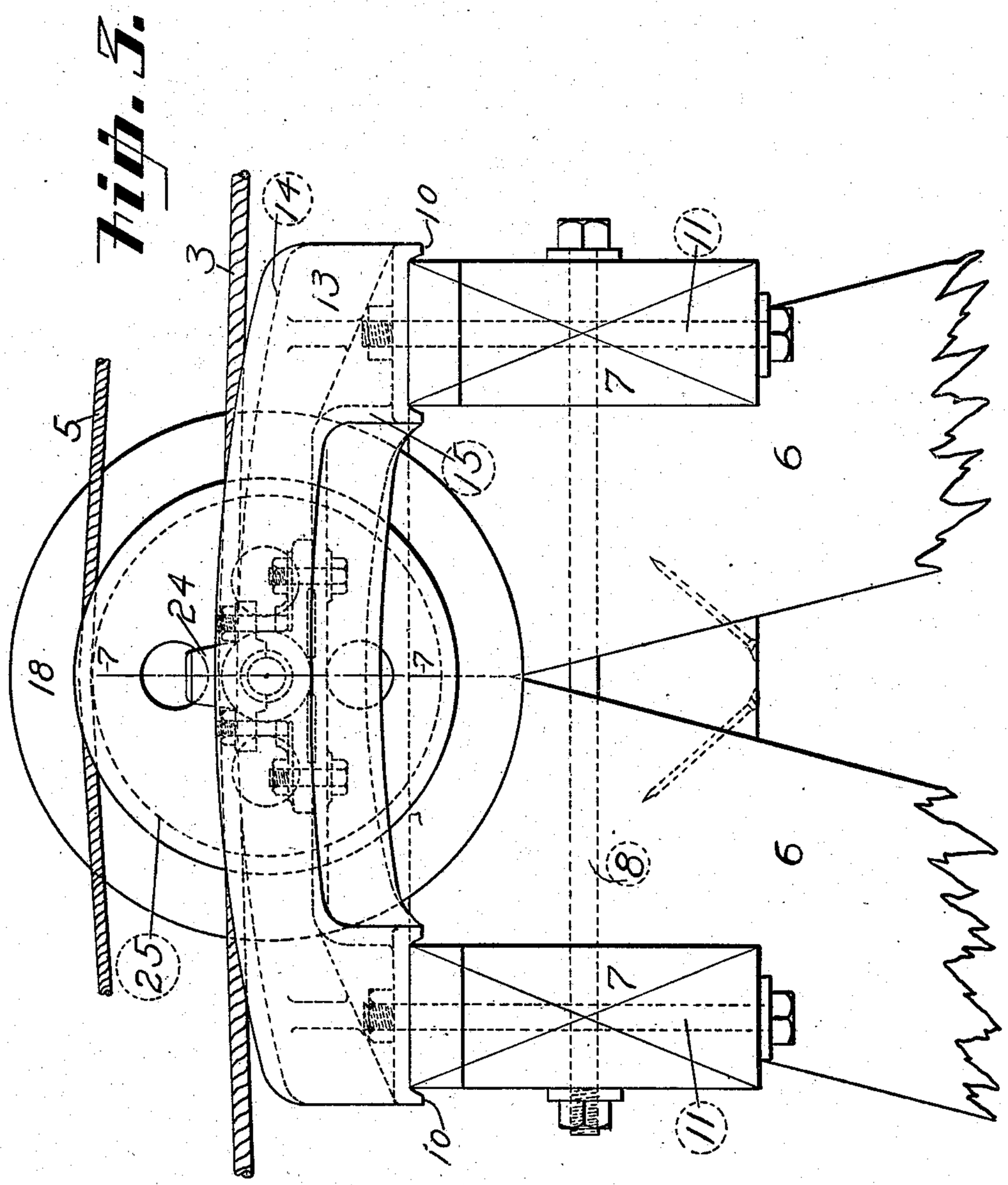
3 SHEETS—SHEET 3.

Fig. 3.



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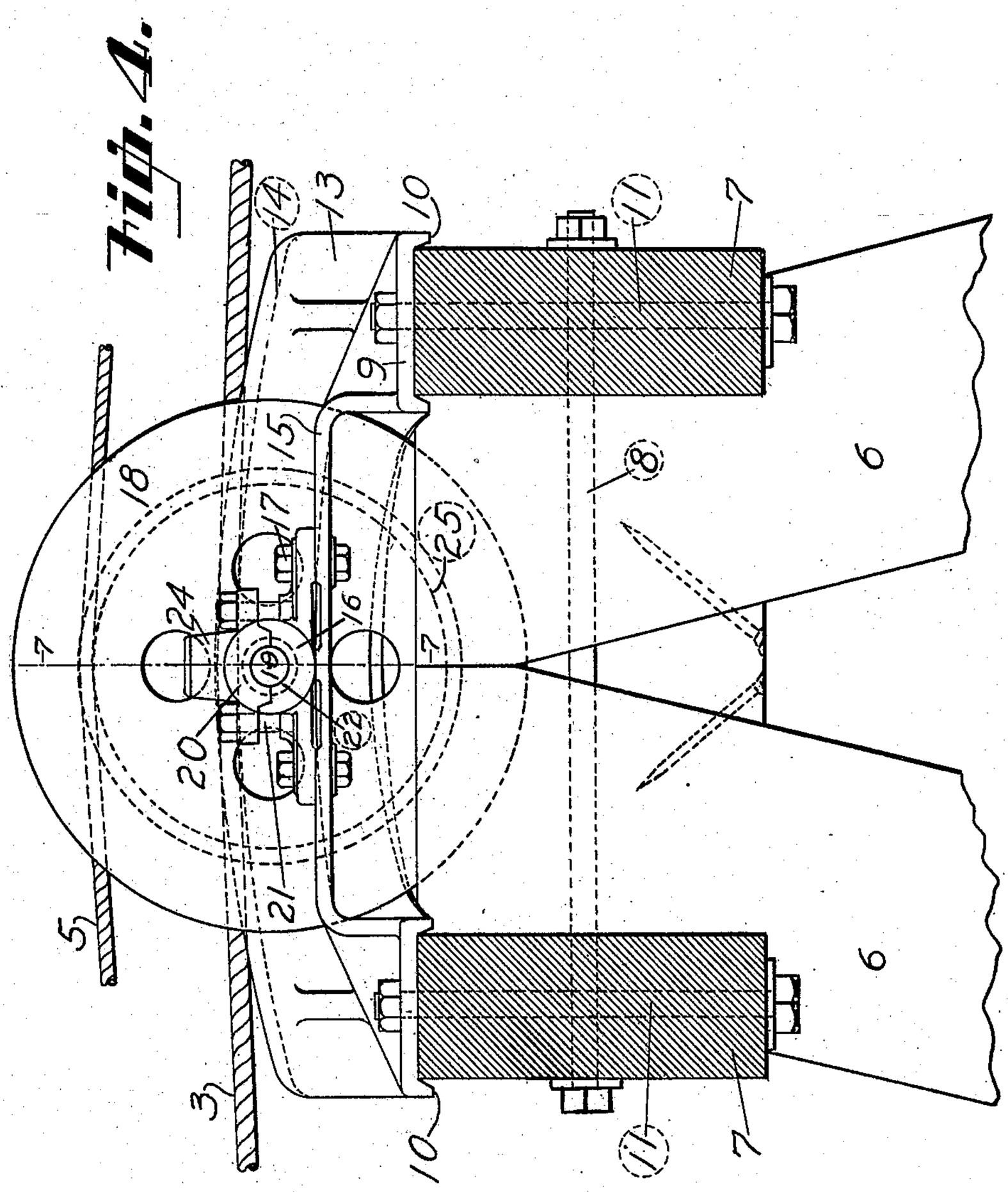
8 SHEETS—SHEET 4.

Fig. 4.



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8 SHEETS—SHEET 5.

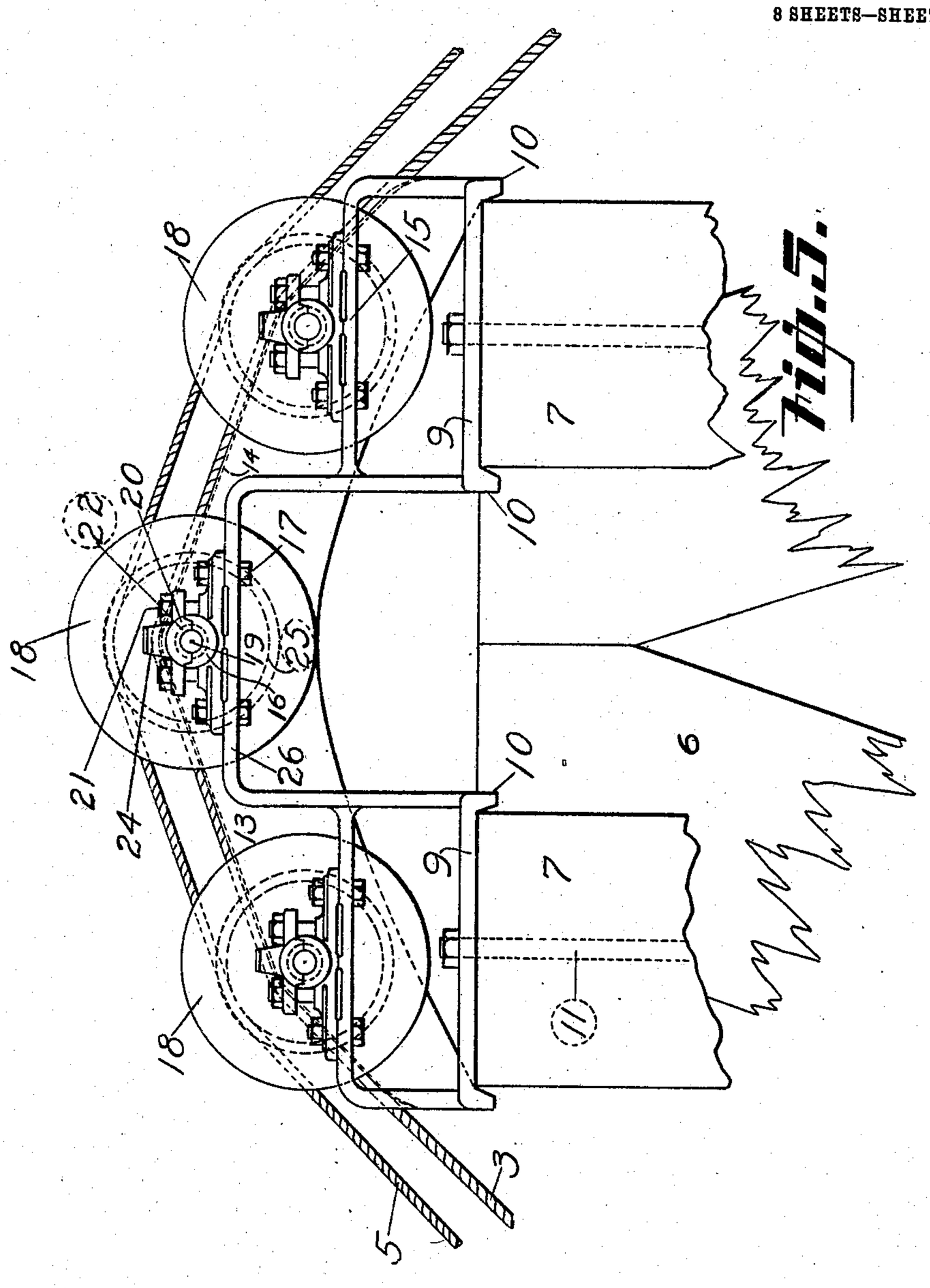

Fig. 5.

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8 SHEETS—SHEET 6.

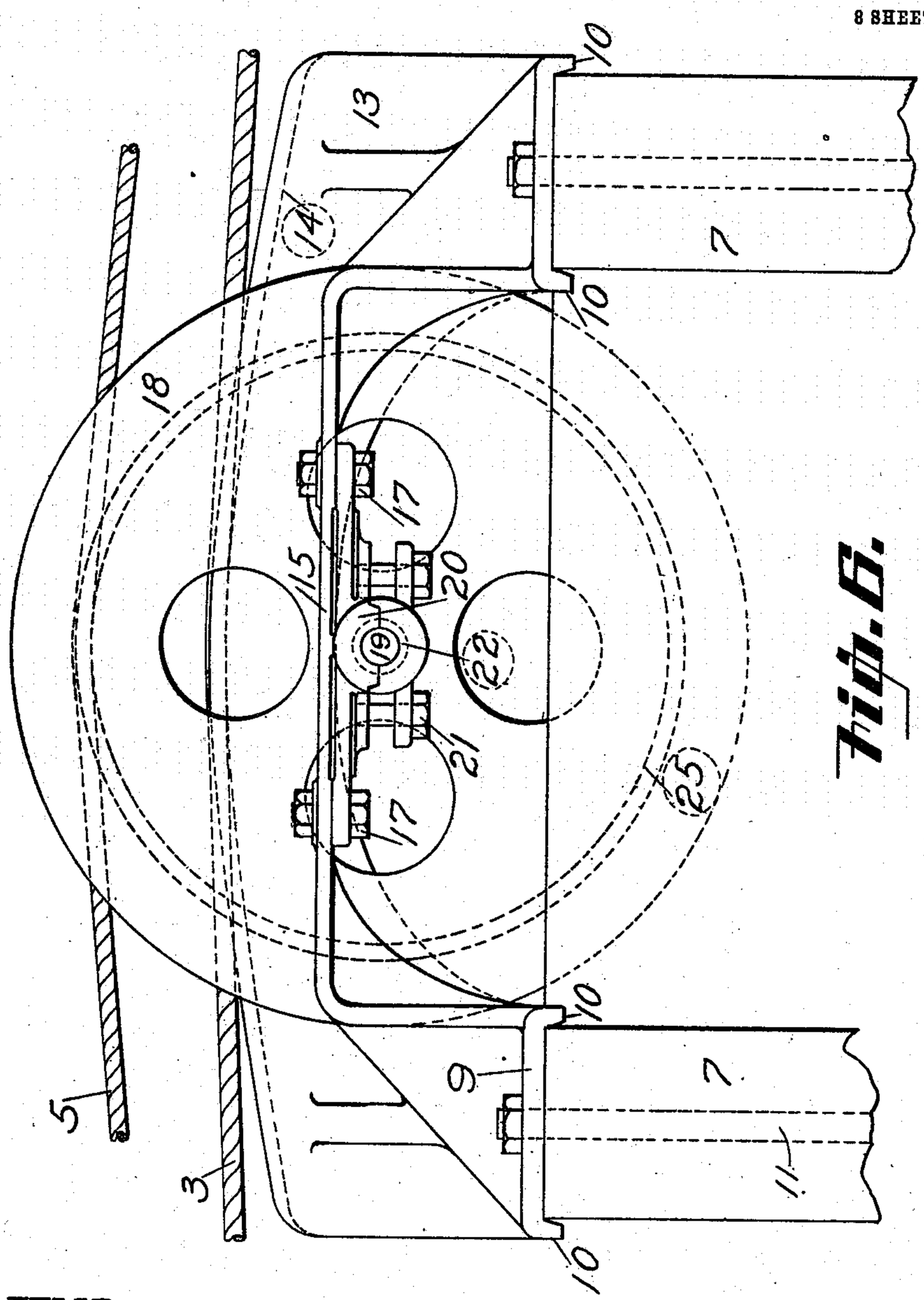

Fig. 6.

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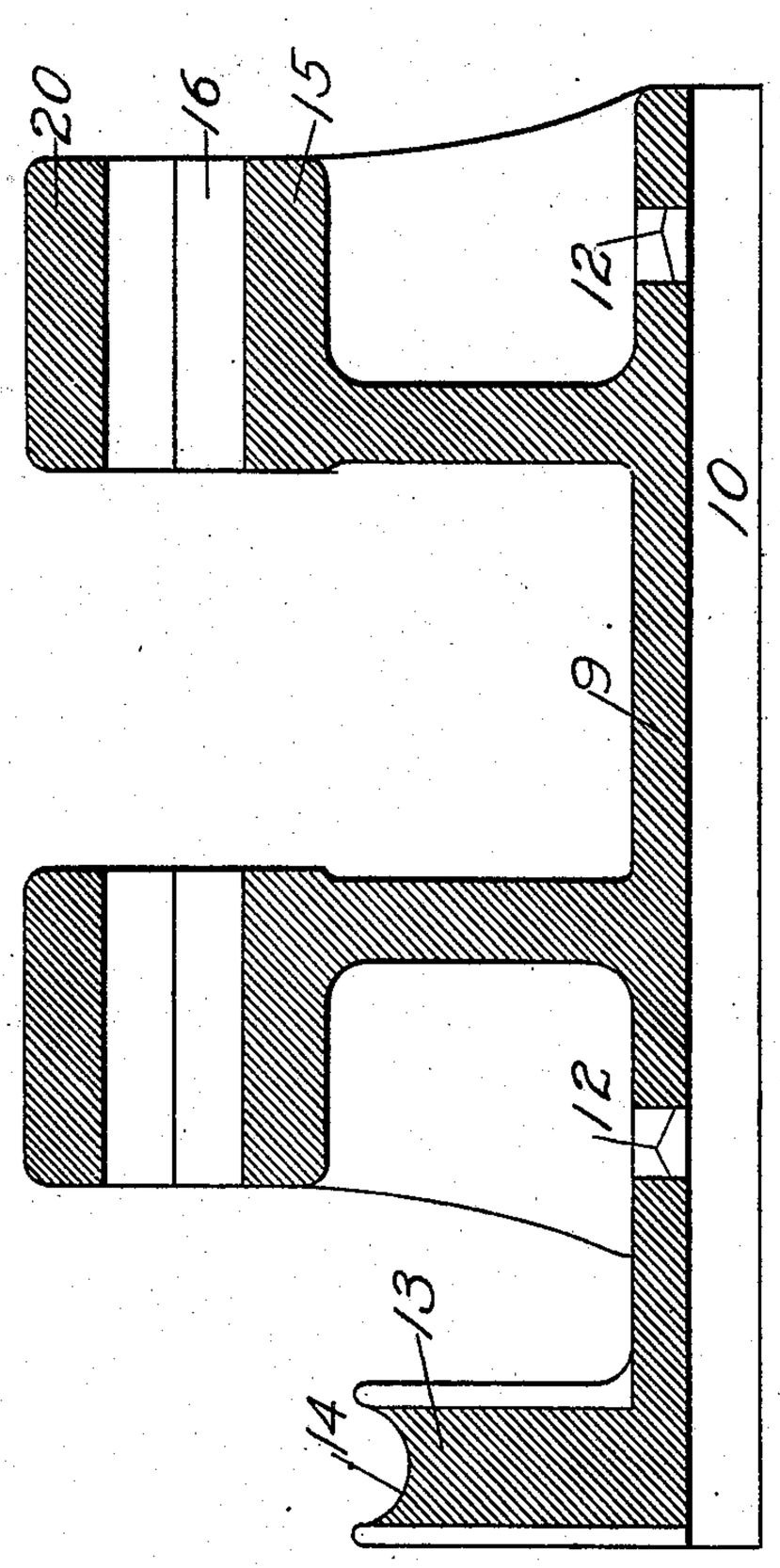
8 SHEETS—SHEET 7.

Fig. 7.



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APPLICATION FILED JUNE 1, 1908.

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8 SHEETS—SHEET 8.

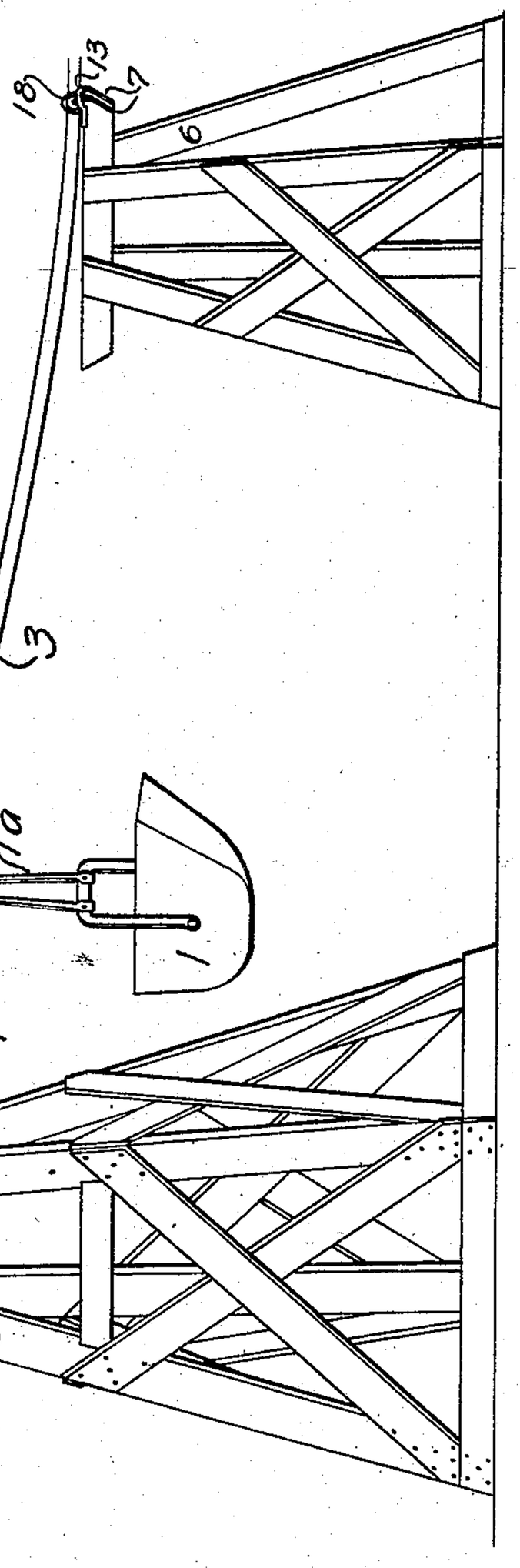

Fig. 8.

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UNITED STATES PATENT OFFICE.

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TRAMWAY TOWER-SADDLE.

No. 900,923. Specification of Letters Patent. Patented Oct. 13, 1908.

Application filed June 1, 1908. Serial No. 435,883.

To all whom it may concern:

Be it known that I, WALTER S. GEMMER, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Tramway Tower-Saddles, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to aerial tramway systems, and has for its object to provide an improved means for supporting the track cable and the traction cable upon the towers which are located intermediate the terminal stations at which the buckets carrying the ore, coal, or similar article are loaded and unloaded. As the distance from the loading station at the mouth of the mine to the unloading station at the wharf or railroad, or other point, is frequently one of several miles, and as aerial tramways are usually installed in mountainous regions necessitating many abrupt turns and sharp angles in the line, and as the traction cable invariably must be endless, these cables, because of the back-and-forth bending to which they are subjected, and because of the stress and strain and wrenching occasioned in the operation of the system, have usually been relatively short-lived.

It is the primary object of this invention to reduce greatly the wear and tear on the traction cable, the essential factors in securing that desired end being the fact that sheaves are employed very much larger in diameter than the sheaves used on other towers and the fact that at each tower the distance between the track cable and traction cable is not only unalterable, but is the same as at any other tower. The large sheaves reduce the wear on the cable because the bend in the cable is less sharp in passing over a large sheave than over a small one, while the preservation of a fixed distance between the two cables is important in that it prevents much strain upon the cables and upon the bucket-carriage that would otherwise be present.

In the drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is an end elevation of the invention, looking in a direction parallel to the axes of the cables; Fig. 2 is an end elevation, similar to Fig. 1, and on an enlarged scale as compared to that figure, of a slightly modified form; Fig. 3 is a front elevation, looking from the left of Fig. 1 in the direction indicated by the arrow A; Fig. 4 is a rear elevation, looking from the right of Fig. 1 in the direction opposite that indicated by the arrow A; Fig. 5 is a rear elevation of a modified form in which a plurality of sheaves for the traction cable is provided, this form of the invention being adapted for use in places where there is a sharp angle in the line; Fig. 6 is a rear elevation of a modified form in which is used a sheave much larger in diameter than the sheave shown in the other figures; Fig. 7 is a sectional view of the base casting taken on the line 7—7, Figs. 3 and 4, all other parts being removed; and Fig. 8 is a perspective view of a part of a tramway system in which the invention is used.

The bucket 1 in which the ore is carried is supported by a suitable pendant 1^a from the trolley-beam 1^b. Sheave 2, which rides upon the track-cable 3, is journaled in said trolley beam, and a clip or grip 4, secured either to the beam or to the pendant, clips the moving traction cable 5; hence, when the traction cable moves, the bucket travels therewith, sheave 2 riding upon the track cable 3, the relative position of the bucket, pendant, cables, and cable-supports being best shown in Fig. 8.

At the top of the tower-uprights 6 of every tower the tower-cap is fixed, said cap comprising a pair of approximately parallel members 7 disposed transversely to the path of travel of the bucket, the uprights 6 and cap-pieces 7 being rigidly bound together by bolts 8. A casting or base 9 extends from one cap-piece 7 to the other (which cap-pieces, though usually made of wood, may be made of concrete, metal, or any other material) and are of any desired size and shape. Said base 9 is provided with flanges 10, each one of which flanges bears against an edge of a cap-piece 7, and thereby prevents the base from being twisted out of place, bolts 11, which pass through perforations 12 in the base, serving to bind said base to the cap-pieces 7. The base 9 supports the saddle 13, which saddle is grooved at 14 to receive the track cable 3, the top of the saddle being preferably curved downwardly, so that the ends of the saddle are ordinarily out of engagement with the cable, and, therefore, can not cut or shear the cable. Staples or loops (not shown) may be provided to bind the

track cable 3 to the saddle and thus keep said cable from slipping back or forth with respect to any supporting tower. Fixed to each of those parts 15 of the base 9 which bridge the space between the cap-pieces 7 is a pillow-block 16, said blocks 16 being secured to bridges 15 by bolts 17, there being, preferably, two bridges, two pillow-blocks, etc., on each base 9. The traction cable 5 passes over a sheave 18, said sheave being mounted upon a shaft 19 which extends across the space from one bridge 15 to the other and which is journaled in the pillow-blocks carried upon the bridges. A cap 20 is fastened by bolts 21 to each pillow-block after the shaft 19 has been put in place, and Babbitt metal 22 poured in so as to surround the shaft and fill up the space between the shaft and the bearing therefor formed of the pillow-block and cap. A set-screw 23 or similar contrivance binds the sheave 18 to the shaft; hence, as the sheave is revolved by the moving of the traction cable 5, the shaft 19 turns within its babbitted bearings. The caps 20 carry grease-cups 24, and, as each of these cups 24 is filled with lubricant, the sheave revolves with the minimum of friction. Although it is preferable to have the sheave tight upon the shaft, and the shaft rotatable in the journals, the shaft may, of course, be fixed and the sheave may be made capable of rotation therearound, and, furthermore, the shaft may be supported at one end only instead of at both ends.

Ordinarily, the shaft 19 is supported above the bridge 15, but, as shown in Fig. 6, the bearings for the shaft may be suspended from said bridges, this construction being employed in cases where it is desired to use a sheave relatively larger in diameter than the sheave shown in Fig. 1, but without increasing the distance from the crest of the saddle to the topmost part of the periphery of the sheave. As shown in Figs. 3, 4, and 6, the sheaves extend below the tops of the cap-pieces 7 and into the space between said members.

In Fig. 5 a construction is shown suitable for use in places where there is such a sharp turn in the line that the traction cable would be badly bent were only a single sheave 18 used, the modification consisting in providing a plurality of sheaves over which the cable rides successively, thus making the turn so gradually as not to injure the cable. The particular arrangement of a plurality of sheaves supported upon a single casting shown in Fig. 5 is especially adapted for use at the top of a hill, but can be modified for use at the bottom of a hill by dropping the central arm 26 of the bridge so that the shaft supporting the middle sheave will be lower than the shafts on which the outer sheaves are carried. A plurality of sheaves can be used, also, in places where the line makes a turn without a change of level, the sheaves in such construction being placed with their respective shafts radiating from a common point, the shafts being in the same horizontal plane.

Since the saddle 13 and the sheave 18 are both supported upon the same base 9 (the base, saddle, and sheave-supporting bridge or bridges preferably comprising an integral formation), it is obvious that the distance from the crest of the saddle to the topmost point of the periphery of the saddle remains constant at each tower, and, moreover, since the base 9 used at each of the several towers is preferably identical in size and shape with the base used at every other tower, it is obvious, also, that said distance is the same at every tower of the system. If, for any reason, the different bases 9 can not be uniform, and if, because of turns in the line, it becomes necessary to employ either of the modifications shown in Figs. 5 and 6, the bases 9 and other parts should be so constructed that the distance from the crest of the saddle to the top of the sheave will be the same at each tower as at every other tower. It follows, accordingly, that the distance between the track cable 3 and the traction cable 5 is uniform throughout the entire system, thus eliminating much strain both upon the cables and upon the bucket-carriage, which strain is necessarily present in systems where the distance between the two cables varies at different points.

The tramway towers now in use comprise suitable uprights which support a single horizontal member or tower-cap, all parts usually being made of timber, though some or all of the parts may be made of metal, concrete, or other material. As closely as possible to the outer end of the tower-cap a saddle is fixed, upon which saddle the track cable is supported. A short distance back from the end of the cap a bracket or upright arm is fixed, outwardly projecting from which is a shaft upon which a sheave revolves, said sheave being adapted to support the traction cable, the shaft being above the middle of the tower-cap. The sheave-supporting bracket and the saddle are independent members, each being bolted to the tower-cap. In said old construction there is no support afforded the ends of the saddle, which ends, as they usually project beyond the tower-cap, are frequently broken off when buckets containing heavy loads pass thereover, and, if it be desired to provide a saddle affording an unusually long bearing for the track cable, such as is needed at turns in the line, that desideratum can be secured only by employing a casting of very great size and weight. Since the sheave is mounted above the center line of the tower cap, it is impracticable to use sheaves of large diam-

eter, and, as small sheaves are much harder on the cables than large sheaves, the use of small sheaves is objectionable. Since, in the old construction, the sheave-carrying shaft is supported at one end only, the shaft is easily bent and often sheared off, especially in cases where the tower on which a certain shaft is held is located at a point where the strain on the traction cable is unusually great. It is, moreover, practically impossible in the old construction, to maintain a proper fixed distance between the traction cable and the track cable at every tower, because not only is it difficult so to place all the saddles and sheave-supports of the system upon their respective towers that the distance between any sheave and the corresponding saddle is the same as the distances between every other sheave and its corresponding saddle, but even if said members are originally so placed, the proper distance between the sheaves and saddles can not be maintained, owing to shrinkage, warping, and bending in the timbers, yielding of the bolts and enlargement of the bolt-holes, and other similar causes.

In the herein-described invention, however, the fact that a single, unitary casting supports both the track cable saddle and the traction cable sheave secures the maintenance at all times of a fixed distance between the track cable and the traction rope, this distance being the same at every tower in the system. In addition, with a single base, the cost of installation is much reduced because the sheave-support and the saddle are both fixed in place at a single operation and because when the saddles are "lined up" with a transit, the sheaves, too, are necessarily "lined up". The provision of a tower-cap which is composed of two members, instead of being a single member, as heretofore, permits the use of sheaves much larger in diameter than those used with a single-piece tower-cap (since in this invention the sheave does not need to clear the tower-cap but extends to a point beneath the top of the cap), secures support for the saddle at both ends instead of in the middle, thereby permitting the use of a long saddle and obviating any tendency for the ends of the saddle to break off, and the tower-cap, being made of two relatively small pieces instead of one relatively large piece, is more easily transported to the place where the tower is to be erected, is more easily handled while the tower is being built than is a large one-piece tower-cap, and, in addition, permits both halves of the tower, when framed upon the ground preparatory to erection, to be identical. Since the sheave-supporting shaft is supported at both ends it is less likely to become bent or sheared than a shaft supported at one end only. It is easier to replace a broken shaft or to renew the Babbitt metal in the present construction than in the old, because, in the old, the shaft was fixed to the supporting bracket, while in this construction the journal boxes are detachable from the base, and it is not necessary to remove the base from the tower-cap. Finally, since the shaft rotates in fixed bearings and the sheave is tight upon the shaft, the lubrication is better than in the old construction in which the sheave rotates upon a fixed shaft.

Having thus described my said invention, what I claim and desire to secure by Letters-Patent is:

1. In an aerial tramway system, the combination of a tower-cap made of two members and a saddle and a bridge supported upon each of said members.

2. In an aerial tramway system, the combination of a tower-cap made of two members and a saddle and a pair of bridges supported upon each of said members.

3. In an aerial tramway system, the combintion of a tower-cap made of two members and a saddle and a pair of bridges supported upon each of said members, a sheave-supporting shaft being supported by said bridges.

4. In an aerial tramway system, the combination of a tower-cap made of two members and a saddle and a pair of bridges supported upon each of said members, said saddle and said bridges being integrally united together.

5. In an aerial tramway system, the combination of a tower-cap made of two members, a base resting upon said members, and flanges on said base engaging each side of each of said members.

6. In an aerial tramway system, the combination of a tower-cap made of two members, a base which rests upon said members, and a saddle and a bridge supported by said base.

7. In an aerial tramway system, the combination of a tower-cap made of two members, a base which rests upon said members, and a saddle and a pair of bridges supported by said base.

8. In an aerial tramway system, the combination of a tower-cap made of two members, a bridge extending from one of said members to the other, and a sheave-supporting shaft carried upon said bridge approximately midway between said members.

9. In an aerial tramway system, the combination of a tower-cap made of two members, a pair of bridges extending from one of said members to the other, and a sheave-supporting shaft carried upon said bridges approximately midway between said members.

10. In an aerial tramway system, the combination of a tower-cap made of two members, a bridge extending from one of said members to the other, a journal supported

upon said bridge, and a sheave-supporting shaft revolubly mounted in said journal.

11. In an aerial tramway system, the combination of a tower-cap made of two members, a bridge extending from one of said members to the other, a journal supported upon said bridge, a lubricating device in connection with said journal, and a sheave-supporting shaft revolubly mounted in said journal.

12. In an aerial tramway system, the combination of a tower-cap made of two members, a pair of bridges extending from one of said members to the other, a journal supported upon each of said bridges, and a sheave-supporting shaft revolubly mounted in said journals.

13. In an aerial tramway system, the combination of a tower-cap made of two members, a bridge extending from one of said members to the other, a journal supported upon said bridge, and a sheave-supporting shaft revolubly mounted in said journal, said journal being detachable from said bridge.

14. In an aerial tramway system, the combination of a tower-cap made of two members, a pair of bridges extending from one of said members to the other, a journal supported upon each of said bridges, and a sheave-supporting shaft revolubly mounted in said journals, said journals being detachable from said bridges.

15. In an aerial tramway system, the combination of a tower-cap made of two members, a pair of bridges extending from one of said members to the other, a pillow-block in connection with each bridge, means securing said pillow-blocks to said bridges, a cap in connection with each pillow-block, and a shaft journaled at each end between one of said pillow-blocks and the corresponding cap.

16. In an aerial tramway system, the combination of a tower-cap comprising a pair of members, a sheave, a shaft therefor supported intermediate said members, and means carried upon said members for supporting both ends of said shaft.

17. In an aerial tramway system, the combination of a tower-cap comprising a pair of members, a sheave, and means supporting said sheave in such position that the lowest point of said sheave is beneath the tops of said members.

18. In an aerial tramway system, the combination of a tower cap comprising a pair of members, a sheave, and means supporting said sheave in such position that said sheave projects into the space between said members.

19. In an aerial tramway system, the combination of a tower-cap comprising a plurality of members, a base supported upon each of said members, and a plurality of sheaves supported upon said base.

20. In an aerial tramway system, the combination of a tower-cap comprising a plurality of members, a base supported upon each of said members, and a plurality of sheaves supported upon said base, said sheaves being out of axial alinement.

21. In an aerial tramway system, the combination of a tower-cap, a base, a saddle and a sheave-carrying shaft supported thereby, the sheave carried upon said shaft being grooved to receive the traction cable, the parts being so placed that the clip or grip drawn by the traction cable remains out of engagement with the faces of said groove.

22. In an aerial tramway system, the combination of a plurality of towers, a track cable and a traction cable supported by each tower, and means at each tower for maintaining unalterably the distance between said cables.

23. In an aerial tramway system, the combination of a plurality of towers, a track cable and a traction cable supported by each tower, and means at each tower for maintaining unalterably the distance between said cables, the distance between the cables at any tower being the same as the distance between the cables at any other tower.

24. In an aerial tramway system, the combination of a base, a member which supports the traction-cable sheave, and a saddle, said member and said saddle being fixed upon said base.

25. In an aerial tramway system, the combination of a base, a member which supports the traction-cable sheave, and a saddle, said member and said saddle being fixed upon said base, all of said parts being integrally united together.

26. In an aerial tramway system, the combination of a base, a member which supports the traction-cable sheave, and a saddle, said member and said saddle being fixed upon said base, with the distance between same unalterable.

27. In an aerial tramway system, the combination of a tower-cap made of two members, a saddle supported upon each of said members, and a cable which extends across the space between said members, said cable being supported upon said saddle.

28. In an aerial tramway system, the combination of a tower-cap made of two members, a saddle supported upon each of said members, and a cable which extends across the space between said members, said saddle being grooved and said cable resting within the groove of said saddle.

29. In an aerial tramway system, the combination of a tower cap made of two members, a saddle supported upon each of said members, a track cable and a traction cable both of which extend across the space between said members, a saddle supported upon each of said members, and a sheave the axis

of which is located in registration with the space between said members, said track cable being supported upon said saddle and said traction cable passing over said sheave.

30. In an aerial tramway system, the combination of a tower-cap made of two members, a traction cable which extends across the space between said members, and a sheave over which said traction cable rides, the axis of said sheave being located in registration with the space between said members.

31. In an aerial tramway system, the combination of a tower-cap, a plurality of sheaves thereabove, and a traction cable which passes over each of said sheaves, said sheaves being out of axial alinement.

32. In an aerial tramway system, the combination of a plurality of towers, a track cable and a traction cable supported by each tower, both of said cables extending entirely across each tower, and means at each tower for maintaining unalterably the distance between said cables.

33. In an aerial tramway system, the combination of a plurality of towers, a track cable and a traction cable supported by each tower, both of said cables extending entirely across each tower, and means at each tower, for maintaining unalterably the distance between said cables, the distance between the cables at any tower being the same as the distance between the cables at any other tower.

In testimony whereof I have affixed my signature in presence of two witnesses.

WALTER S. GEMMER.

Witnesses:

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